

What is claimed is:

1. A method of watermarking an image to facilitate detection of copying of the image, the method comprising:

(a) providing image data that represents an image, the image data comprising pixel data that represents respective gray-scale values of pixels of the image;

(b) forming a plurality of data blocks from the image data, each data block consisting of pixel data which corresponds to a respective region of the image;

(c) determining for each of the data blocks an average value of the pixel data in the data block;

(d) determining for each of the data blocks a target for the average value of the pixel data in the data block; and

(e) adjusting respective values of at least some of the pixel data in each of at least some of the data blocks to shift the average value of the pixel data in the respective data block toward the target for the respective data block.

2. The method according to claim 1, wherein the respective target for each data block is determined based at least in part on a value of a message bit that corresponds to the respective data block.

3. The method according to claim 1, wherein the respective target for each data block is selected from a predetermined set of gray scale levels as a one of said set of gray scale levels to which the average value of the pixel data in the data block is closest.

4. The method according to claim 1, wherein the pixel data adjusted at step (e) corresponds to pixels at a center of the region of the image to which the data block corresponds.

5. The method according to claim 1, wherein each of the data blocks corresponds to a respective discrete region of the image.
6. The method according to claim 5, wherein the regions are rectangular.
7. The method according to claim 6, wherein the regions are square.
8. The method according to claim 1, further comprising:
 - (f) printing a printed image on the basis of the image data after adjustment according to step (e).
9. The method according to claim 8, wherein the image data is subjected to a transformation that is performed after step (e) and before step (f).
10. The method according to claim 1, wherein step (e) is completed with respect to a particular one of the data blocks when the average value of the pixel data in the particular one of the data blocks substantially equals the respective target for the particular one of the data blocks.
11. A method of determining whether a printed-image-under-examination (PIUE) is a copy of an original printed image, the method comprising:
 - (a) scanning the PIUE to generate scanned image data, the scanned image data comprising pixel data, the pixel data comprising gray scale values and representing the PIUE as a set of scanning pixels;
 - (b) forming a plurality of data blocks from the scanned image data, each data block consisting of pixel data which corresponds to a respective region of the PIUE;

(c) determining for each of the data blocks an average value of the pixel data in the data block;

(d) determining for each of the data blocks an index value based on the average value of the pixel data in the data block; and

(e) for each data block, calculating a difference between the index value for the data block and a value that represents a target value for a corresponding block of pixel data that was used to generate the original printed image.

12. The method according to claim 11, wherein the index value for each data block is selected from a predetermined set of gray scale levels as a one of said set of gray scale levels to which the average value of the pixel data in the data block is closest.

13. The method according to claim 12, further comprising:

(f) squaring the differences calculated in step (e).

14. The method according to claim 13, further comprising:

(g) summing the squared differences.

15. The method according to claim 14, further comprising:

(h) comparing a sum generated at step (g) with a threshold.

16. The method according to claim 15, further comprising:

(i) providing an indication as to whether the PIUE is an original printed image on the basis of a result of step (h).

17. The method according to claim 11, wherein the PIUE was printed with a first resolution that is less than a second resolution at which the PIUE was scanned in step (a).

18. A method of determining whether a printed-image-under-examination (PIUE) is a copy of an original printed image, the method comprising:

(a) scanning the PIUE to generate scanned image data, the scanned image data comprising pixel data, the pixel data comprising gray scale values and representing the PIUE as a set of scanning pixels;

(b) forming a plurality of data blocks from the scanned image data, each data block consisting of pixel data which corresponds to a respective region of the PIUE;

(c) determining for each of the data blocks an average value of the pixel data in the data block;

(d) determining for each of the data blocks an index value based on the average value of the pixel data in the data block; and

(e) for each data block, calculating a difference between the index value for the data block and an expected value of the index value.

19. The method according to claim 18, wherein the index value for each data block is selected from a predetermined set of gray scale levels as a one of said set of gray scale levels to which the average value of the pixel data in the data block is closest.

20. The method according to claim 19, further comprising:

(f) squaring the differences calculated in step (e).

21. The method according to claim 20, further comprising:

(g) summing the squared differences.

22. The method according to claim 21, further comprising:
- (h) comparing a sum generated at step (g) with a threshold.
23. The method according to claim 22, further comprising:
- (i) providing an indication as to whether the PIUE is an original printed image on the basis of a result of step (h).
24. The method according to claim 18, wherein the expected value of the index value for each of the data blocks is representative of a target value that was used to generate pixel values for a corresponding pixel block of the original printed image.